

REMARKS

Claims 1, 3, 4 and 6 have been rejected by the Examiner under 35 USC §103(a) as being unpatentable over Stuhldrecher, U.S. Patent 6,080,809, in view of Freeman et al., U.S. Patent 5,840,795. Claims 1, 3, 4 and 6 have been further rejected by the Examiner under 35 USC §103(a) as being unpatentable over Stuhldrecher in view of Fukumoto et al., U.S. Patent 5,591,794. These rejections are respectfully traversed.

The present invention is directed to a rubber composition for tire treads and Pneumatic tires which contain a tire tread made of the rubber composition wherein said rubber composition significantly improves the wet skid performance (grip performance on wet roads) without decreasing the abrasion resistance and rolling resistance of the tire. ✓

As the Examiner will note, claim 1 is proposed to be amended and, as such, is characterized by the following features:

1. (Feature 1) 5 to 60 parts by weight of carbon black;
2. (Feature 2) A total amount of clay and silica of 40 to 79 parts by weight;
3. (Feature 3) A total amount of clay and silica and carbon black of 41 to 80 parts by weight;
4. (Feature 4) 30 to 50 parts by weight of clay; and
5. (Feature 5) The clay has an average particle size of 0.5 – 10 μm .

When all the features 1-5 above are satisfied, all of the wet skid performance, abrasion resistance and rolling resistance are significantly improved.

As the Examiner will recall, claim 1 was previously amended to recite that the amount of clay present in the rubber composition is 30 to 50 parts by weight. The previous amendment to

claim 1 was based upon the results achieved when referring to example 3 in Table 1 of the present application. In referring to Table 1, it can be seen that when clay is present in an amount of 30 parts by weight, the rolling resistance index and wet skid index is improved. Please note in this respect that the rolling resistance index and the wet skid index for examples 1, 2 and 4 in Table 1 are not as good as those of example 3 where the higher amount of clay is present in the rubber composition. This result is somewhat unexpected inasmuch as the rolling resistance index and the wet skid index ~~do~~^{are} not merely improve^d by increasing the amount of clay which is added to the rubber composition. Thus, for example, when the amount of clay is increased from 5 to 10 parts by weight as shown in examples 1 and 4, the rolling resistance and the wet skid index do not improve, but rather become inferior. On the other hand, by continuing to increase the amount of clay to 30 parts by weight as shown in example 3, both the rolling resistance index and the wet skid index improve. ~~Thus, though in~~^{although} normal geometric progression of the amount of clay might suggest a normal improvement in the rolling resistance index and the wet skid index, as can be seen by increasing the amount of clay from 5 to 15 as shown in examples 1 and 2, this logic is defeated when the rolling resistance index and the wet skid index becomes inferior when 10 parts by weight of clay is utilized, as shown in example 4. Accordingly, it cannot be expected that 30 parts by weight of clay added to the rubber composition would be effective in achieving advantageous indexes for both rolling resistance and wet skid.

As shown in table 1 of the present specification, in comparative example 6, which does not satisfy feature 3 and feature 4 as noted hereinabove, the rolling resistance index and the wet skid index are respectively low values of 80 and 93, respectively.

Also, in experiment 1 of the Declaration which is submitted with the present response, which does not satisfy feature 5 as noted hereinabove, since clay B having an average particle size outside of the range of 0.5 to 10 μm (that is 0.2 μm) is compounded, the Lambourn abrasion resistance index is a low value of 98 and the rolling resistance index and wet skid index are respectively values of 102 and 115. The data of experiment 1 was obtained by the inventor for comparison with example 3 of the present specification by measuring a rubber composition in which clay (ASP-ultra fine, available from Englehard, with an average particle size of 0.2 μm) was compounded instead of the clay of example 3. ✓

In contrast to comparative example 6 and experiment 1, in example 3, the Lambourn abrasion resistance index, the rolling resistance index and the wet skid index are ~~respectively~~ respectively, significantly improved to a 103, 108 and 120. Particularly, the rolling resistance index and wet skid index in example 3 are the largest of the data of table 1 in the present specification. Thus, the subject matter shown in table 1 and the accompanying Declaration surely show the importance of all the features 1-5 as set forth hereinabove of the present application. The Stuhldreher patent fails to disclose any specific examples of a tire tread rubber composition which includes clay in an amount of at least 30 parts by weight, as utilized in the composition of the present invention. Thus, the Stuhldreher fails to recognize the importance of feature 4 of the present invention as set forth hereinabove wherein the amount of clay which is present in the rubber composition is within the range of 30 to 50 parts by weight.

Also, the clay component of the Stuhldreher patent has a medium particle size of from about 0.2 microns which does not compare favorably with the particle size of 0.5 to 10 microns as recited in the claims of the present application. As noted on page 4 of the present application,

clay having too small of an average particle size agglomerates easily, is difficult to disperse in rubber components, and does not provide a rubber composition having desired performance. The use of clay having an average particle size of 0.5 to 10 μm achieves an effective balance among reinforcing performance, ~~what~~^{wet} grip performance, low fuel consumption, and the like. Because of this deficiency and because the reference patent in column 2, line 2, describes the use of clay only in amounts of 5 to 20 parts by weight, which falls outside of the range of 30 to 50 parts by weight of clay, as recited in claim 1 of the present application, it is believed that the reference patent fails to appreciate the inventive contribution provided by the clay component when the clay component is limited as defined by the claims of the present application.

The Freeman patent, on the other hand, describes carbon black and silica as being merely optional fillers (see col. 20, lines 19-34) and the amount of carbon black, the total amount of clay and silica and the total amount of clay silica and carbon black are not defined. ~~However, in~~ Ingredient 14C of table 13 shows a combination of silica, clay and carbon black. However, the amount of carbon black, the total amount of clay and silica and the total amount of clay, silica and carbon black are respectively 4.4 parts by weight, 80 parts by weight, 84.4 parts by weight, which do not satisfy any of the features 1-3 of the present application as set forth hereinabove. Accordingly, one skilled in the art with the Stuhldreher and Freeman et al. references before him cannot obtain the excellent effect of improving all of the rolling resistance index, wet skid index and Lambourn abrasion resistance index by satisfying all of the features 1, 2, 3, 4 and 5 as set forth hereinabove. Accordingly, to reject the claims of the present application, the Examiner must dissect bits and pieces from each of the references and can only do so in view of the Applicants own disclosure.

The Fukumoto et al. reference is relied upon by the Examiner to show the use of clay in making tire treads wherein the clay has a particle size of 1 micron. However, the referenced patent neither describes nor suggests that using clay, carbon black and silica together is essential within the context of the teachings of the Fukumoto et al. patent. In fact, there is no example present in the Fukumoto et al. patent which shows using clay carbon black and silica together. Accordingly, the referenced patent does not recognize the importance of satisfying the parameters of features 1 to 5 recited hereinabove to obtain the excellent effect of improving all of the rolling resistance index, wet skid index and Lambourn abrasive resistance index. Thus, although the Fukumoto et al. ^{reference} describes blending clay in a tread rubber composition in an amount of 10 to 40 parts by weight, based on ¹⁰⁰ ~~other~~ parts by weight of the rubber component, examples 1-11 utilize the maximum amount of 22 parts by weight of clay which is compounded in the rubber composition, and clearly indicating ²² ~~ing~~ that large amounts of clay of 30 parts by weight or more is not contemplated by the referenced patent. Furthermore, although the Fukumoto et al. patent describes that adding silica as a reinforcing agent is preferable (see col. 2, lines 47-49), silica is not contemplated in the examples and the object of the invention is merely described as improving the ^{gripping} ~~grip~~ force of a studless tire (see col. 1, lines 57-60). Therefore, the Fukumoto et al. patent does not compound with clay in order to solve the problems that occur by compounding with silica and accordingly, the Fukumoto et al. patent does not contemplate the Applicants inventive contribution. Since the Fukumoto et al. patent does not utilize silica and since the reference patent does not try to solve the same problems as the present invention, it is the Applicants position that it would not be obvious as suggested by the Examiner to modify the teachings of ^{the} ~~Stuhldreher~~ patent with those of the Fukumoto patent in an attempt to suggest the

present invention. To do so, would require the Examiner would require the Examiner to reconstruct the teachings of the references in view of the Applicants own disclosure.

Accordingly, in view of the above amendments and remarks and in view of the Declaration attached hereto, reconsideration of the rejection and entry of the Proposed Amendment has placed the present application in condition for allowance is respectfully requested. In the event that the Proposed Amendment does not place the present application into condition for allowance, entry thereof is respectfully requested to place the present application into better condition for appeal.

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Respectfully submitted,

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